

Status Report – Injection Working Group

Working group to find strategy for more efficient start-up of injectors and associated facilities after long stops

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Working Group Approach – Transparency from December

- ❑ Representatives from all machines around the table

- ❑ Analyze commissioning and start-up after LS1
 - What worked well? And why?
 - Which areas need improvement? And why?

- ❑ Define common approach across different machines
 - Learn from each other; learn from the LHC if applicable
 - Define how to test, what to test, when to test and who should test
 - Formalize testing and follow-up: check lists

 - E.g.: collaborative testing between equipment groups, OP and controls already before machine check-out – “Dry runs”

Working Group Composition

- ❑ The core: 2 members of each machine/facility (often shifters)
 - SPS, PS, PSB, ISOLDE, LEIR, AD
- ❑ Chair : V. Kain. Deputy: B. Mikulec
- ❑ Scientific secretary: B. Lefort
- ❑ Meetings in indico: <https://indico.cern.ch/category/6174/>
 - 6 meetings so far since end of January

Status

- ❑ Discussed the start-up approach, testing procedures and issues of ALL machines
 - also had presentation from the LHC
 - nTOF and EA will be invited to participate
- ❑ Many common issues found
- ❑ We are in the process of establishing **new approach**

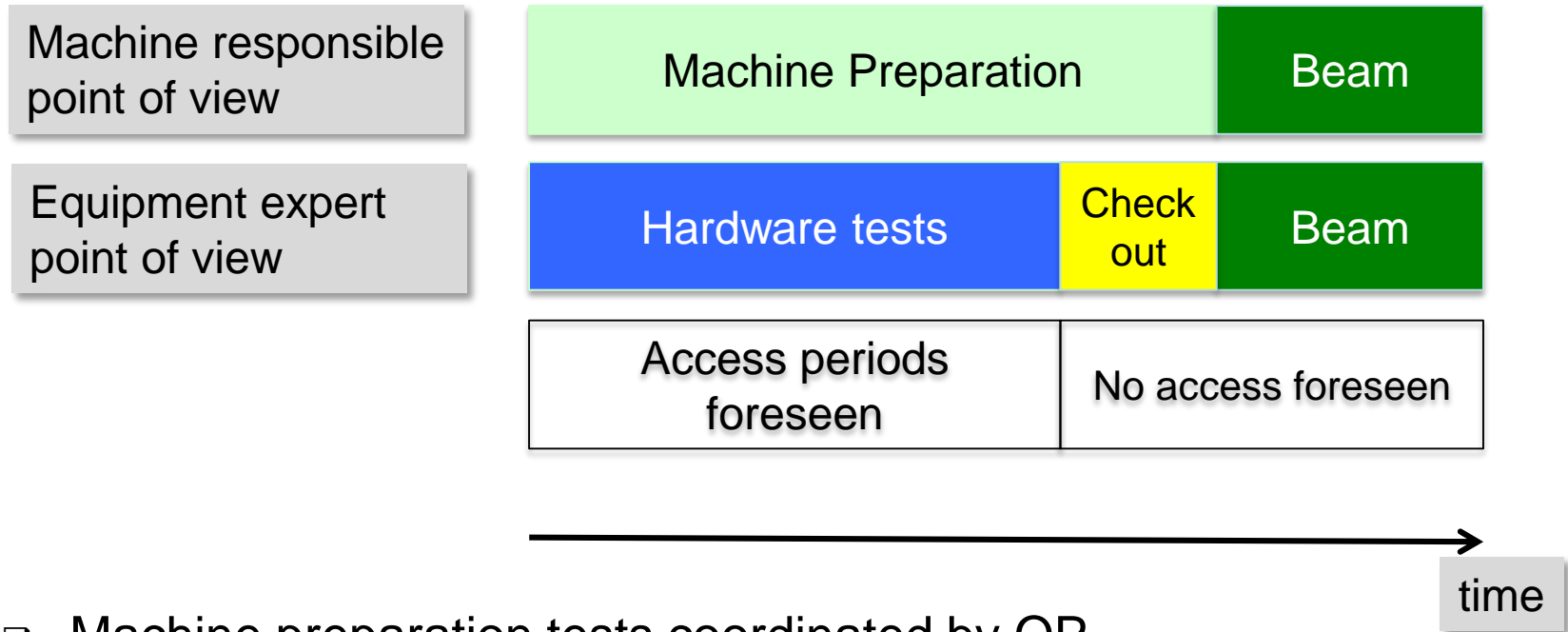
Main Common Issues

- ❑ Partial test coverage; missing or incomplete check lists
 - Settings preparation and verification from physics to hardware parameter incomplete: optics preparation,...
 - Conventions not established for polarity checks
 - Missing references for BI systems e.g. mini scans..
 - ...
- ❑ Testing starting too late
- ❑ Priority issues LHC \leftrightarrow injectors
- ❑ Single expert not always available
 - Holiday period
- ❑ Interfaces between multiple systems not sufficiently tested
 - access \leftrightarrow equipment, SPS PS
- ❑ Control tools' readiness: e.g. FESA 3
 - Readiness requirements need to be clearly communicated
- ❑ Insufficient communication of modifications of equipment and controls to OP

Main proposed improvements

- ❑ Preparation of check lists
 - Skeleton prepared by working group
 - Each machine prepares check list
 - Polarity checks will become obligatory. Convention to be established
- ❑ 1 (or 2) person per machine/facility in OP responsible for machine preparation
 - Ensure check-lists complete
 - Follow-up, progress tracking
 - Organization of coordination meetings before test period. Communication with equipment experts for readiness, modifications,...
 - Organize tests
- ❑ Start testing earlier
 - With equipment experts in dry runs: “full” vertical slices with “all” interfaces

Introduction of New Phase



- ❑ Machine preparation tests coordinated by OP
 - Coordination with equipment experts and MEF
 - Equipment experts to participate in the tests
- ❑ Hardware test and accesses: coordinated by OP and MEF

To be answered: How to deal with modifications?

- ❑ In case of introduction of “major” machine modifications during long stops
 - Involve machine responsible (OP/ABP) during specification phase
 - If possible, staged deployment of different features followed by dry runs “long before end of stop

 - Example: deployment of FGCs in the SPS

- ❑ Introduce test mode in equipment for realistic testing without beam
 - Where necessary
 - Example: FGC simulation mode
 - Caution: need protect against accidently leave equipment in simulation during beam operation

Skeleton check list – EDMS document

- ❑ To be filled in by each machine.
- ❑ To be published after each re-commissioning.

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CHECK LIST

Machine Preparation after long Stop for Accelerator xxxx

ABSTRACT:
This documents lists the different tests without beam to be carried out to ensure the correct functioning of the accelerator after a long stop.

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Work in progress

Skeleton check list – EDMS document

2. Prerequisites for OP Machine Preparation

The following systems are required to work from the first test. They do not have to be in the final version however. Further modifications from start of Machine Preparation have to be communicated to OP.

- CCM operational
- CCC consoles operational
- Timing system operational: can load timing sequences
- CMW, FESA operational
- All INCA services operational: generation, ~~equipstate~~, trim (copy, acquire)
- ...

3. Parameters, optics, settings

What	<u>applications</u>	<u>date</u>	<u>who</u>	<u>comment</u>
Prepare optics, check element names, new elements; upload optics for run				
Generate a few cycles; check generation rules for equipment updated (circuits, timing, RF...)	Generation application			

Work in progress

Conclusion

- ❑ Close to finishing analysis of start-up after LS1 in the injector complex
- ❑ Many common issues found. Résumé: direction for improvement clear
- ❑ Improvements will include
 - Definition of “machine preparation” responsible
 - For communication, coordination meetings, test programme
 - “Complete” check lists; more tests
 - Learn from each other: polarity checks, test modes,...
 - Need to ensure that check lists stay “alive”
 - Start testing early
 - Dry runs long before machine check-out. Staged deployment of modifications followed by test of new functionality as early as possible
- ❑ IRWG: very pleasant experience to see all machines working together